

BEST AVAILABLE COPY

(12) UK Patent Application (19) GB (11) 2 088 832 A

(21) Application No 8131929
(22) Date of filing 22 Oct 1981

(30) Priority data

(31) 55/153442

(32) 31 Oct 1980

(33) Japan (JP)

(43) Application published
16 Jun 1982

(51) INT CL³

B65H 43/00

(52) Domestic classification
B8R 563 564-571 572
584 586 TC

(56) Documents cited
GB 2056415A
GB 1571229

(58) Field of search
B6C
B8R

(71) Applicants

Laurel Bank Machine
Company Limited,
No. 1-2, 1-chome,
Toranomon, Minato-ku,
Tokyo, Japan

(72) Inventors

Kiyoshi Fujii,
Teruhisa Chiba

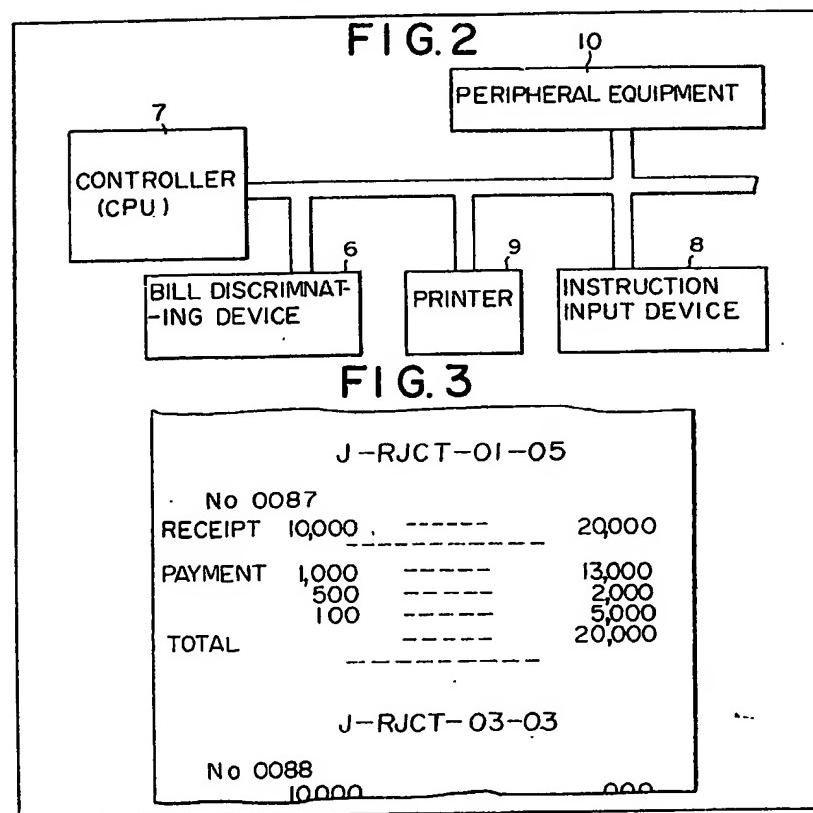
(74) Agents

Forrester, Ketley & Co.,
Forrester House, 52
Bounds Green Road,
London N11 2EY

(54) Bank note receiving apparatus

(57) A bank note receiving apparatus for use in a change machine or an automatic deposit machine includes a bank note discriminating device (6) for checking whether or not a bank note is correct. The discriminating device signals which indicate why a bank note is incorrect are stored in a memory of a controller (7). In

accordance with an instruction from an instruction input device (8), the signals are delivered from the memory of the controller to a printing device (9) which prints out the reasons why a bank note is incorrect, e.g. at the time the banknote is rejected or during a maintenance operation carried out on the machine. The printer may print out the number of times the same type of discrimination signal has caused rejection of banknotes.

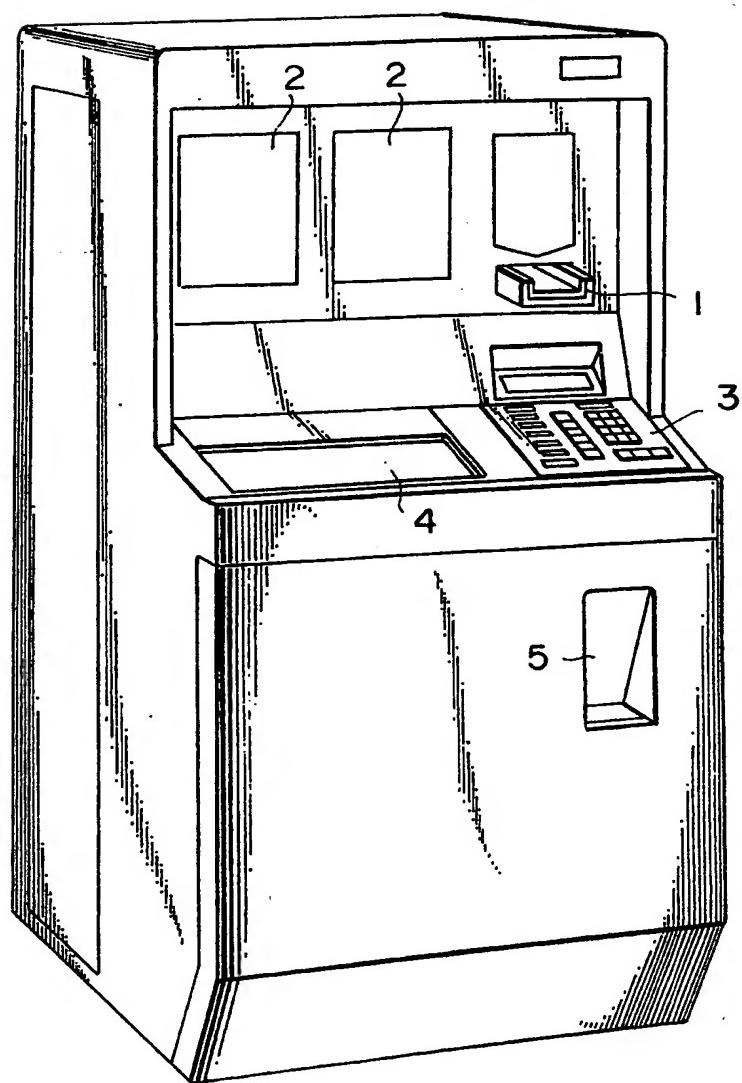


GB 2 088 832 A

2088832

1/2

FIG. I



2088832

2/2

FIG.2

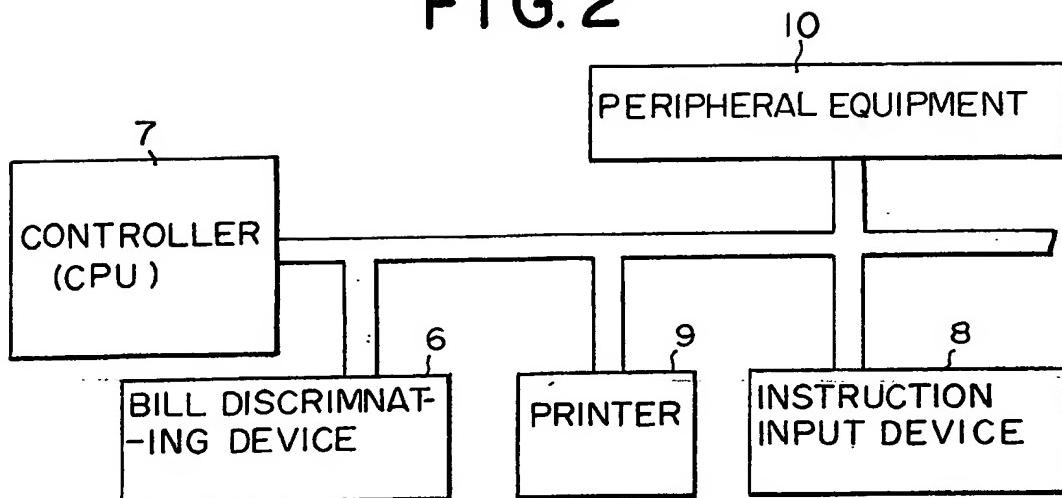


FIG.3

J-RJCT-01-05		
No 0087		
RECEIPT	10,000	-----
		20,000
PAYMENT	1,000	-----
	500	-----
	100	-----
TOTAL		-----
		20,000
J-RJCT-03-03		
No 0088	10,000	000

SPECIFICATION
Bank note receiving apparatus

This invention relates to bank note receiving apparatus for use in a change machine, automatic deposit machine or the like.

Bank note receiving apparatus must accept only correct bank notes and reject incorrect bank notes. To do this, the apparatus is provided with a bank note discriminating device which checks the type of bank note and the correctness of the bank note in various ways. For instance, a conventional bank note receiving apparatus has a discriminating device which can check the photo pattern of a bank note using a photosensor, check if two bank notes have been supplied simultaneously, check the length of the bank notes, and check if the bank notes are being supplied continuously. It is also possible to check a magnetic pattern of a bank note with a magnetic sensor. These checks are performed by a discriminating device, the performance of which is determined by an electric adjustment (level adjustment) of an electric circuit of the device.

Conventional change machines, deposit machines and so forth, however, have the following disadvantage. Namely, even if these machines are delivered and situated after being optimally adjusted, the performance of the discriminating device changes gradually due to changes with time of the elements used in the device, collection of dust, temperature changes, or wear of the belt which transfers the bank notes.

In the conventional apparatus, correct bank notes which are judged as being unacceptable as a result of changes in the performance of the discriminating device have been rejected as well as incorrect bank notes. Therefore, when the administrator of the change machine or the deposit machine becomes aware of an increase in the rejection rate, it is necessary to investigate the reasons for the increase. To do this, a maintenance person must acutally insert a number of bank notes into the machine to find out what kind of bank notes are being rejected by which checking function, and then, for example, readjust the levels, which is troublesome work. Thus, the maintenance person must spend a considerable amount of time investigating the reasons for the increase in the rejection rate. Another problem is that the bank notes inserted by the maintenance person are not always rejected for the same reasons as those rejected during ordinary use of the machine. Furthermore, the bank notes carried by the maintenance person are often in a better condition than the bank notes carried by the ordinary users of the machines, so that the rate of rejection during inspection is usually much lower than that during ordinary use, making it difficult to ascertain exactly the reasons for rejection.

According to the invention, there is provided bank note receiving apparatus, comprising: bank note discriminating means for checking whether or not a bank note is correct; controlling means for receiving signals from the bank note

65 discriminating means indicating the reasons why a bank note is incorrect and having a memory for recording the signals; instruction input means for giving an instruction concerning the reasons why a bank note is incorrect to the controlling means; 70 and printing means for printing out the reasons why a bank note is incorrect upon receipt of an instruction from the controlling means.

In order that the invention may be more readily understood, an embodiment thereof will now be described, by way of example, with reference to the accompanying drawings, in which:

FIGURE 1 is a perspective view of a change machine incorporating bank note receiving apparatus embodying the invention;

80 FIGURE 2 is a block diagram of a control circuit for handling the bank notes; and

FIGURE 3 illustrates a printout from the bank note receiving apparatus showing the reasons for rejections.

85 Referring now to the drawings, Figure 1 shows a change machine incorporating bank note receiving apparatus embodying the invention.

Bank notes are inserted into the machine through a bank note receiving opening 1.

90 Instruction panels 2 with money exchange instructions and other remarks for the user are provided, together with an operating panel 3 for inputting and displaying the amount of money to be exchanged and so forth. Pay-off openings 4 and 5 are also provided, through which the changed bank notes and coins are discharged. In operation, as in the case of a conventional machine, a bank note inserted into the bank note receiving opening 1 is checked by a bank note

95 discriminating device 6 (Figure 2) to ensure that the bank note is correct and is of the correct type and any incorrect bank note is rejected and returned through the bank note receiving opening 1.

100 Figure 2 shows a control circuit for treating a rejected bank note. The discriminating device 6 delivers to a controller 7 various codes representing the kinds of check functions performed such as an abnormal running (01),

110 abnormal bank note length (02), double feed of bank notes (03), abnormal photopattern (04), abnormal magnetic pattern (05), continuous feed of bank notes (06) and so forth, together with a signal representing the type of bank note such as a 115 10,000 yen bank note (01), a 5,000 yen bank note (02), a 1,000 yen bank note (03), a 500 yen bank note (04) and so forth, if the type of bank note is discriminated. The controller 7 is a device such as a central processing unit capable of performing

120 the ordinary exchanging functions and having a memory for memorizing various data. The controller 7 can, according to an instruction previously given by an instruction input device 8, either print the reason for rejection of a bank note automatically at the time of the rejection--

(automatic printing mode), or print the reasons for rejection optionally at any time when requested (optional printing mode), for example, during maintenance of the machine. If the selected mode

- is, for example, the automatic printing mode, a printer 9 is actuated at the time of each rejection to produce a printout similar to that shown in Figure 3. Reference numeral 10 generally 5 designates peripheral equipment which includes, for example, bank note and coin pay-off devices in the case of the money changing machine.
- In the case where the reason for rejection is to be printed at the time of each rejection (automatic 10 printing mode), the instruction input device 8 is switched to the automatic printing mode, while, when it is desired to print out the types of rejected bank notes and the reasons for rejection which have occurred up to a time the machine is 15 examined for maintenance, the instruction input device 8 is switched to the optional printing mode. In the latter case, printing is started by pressing a print button provided in the instruction input device 8, at any time as required for examination 20 of the machine. The printer 9 is disposed at a place different from the operation section 3, such as at the rear panel of the machine which is not visible to the ordinary user of the machine.
- Figure 3 shows an example of the printout of 25 data obtained in the automatic printing mode. The data reads "J-RJCT-01-05". The code "J-RJCT" is a code representing rejection of the bank note by the bank note discrimination device 6. The coil "01" indicates that the rejection bank note is for 30 example a 10,000 yen bill and the code "05" indicates that the reason for rejection is an abnormality in the magnetic pattern of the bank note. The method of the printing can be determined as desired.
- 35 The automatic printing mode offers the advantage that the reasons for rejection can be seen with respect to time, that is, the number of money changing operations. For this reason, it is preferable to record the time of rejection together 40 with the reason for rejection.
- Other portions of the printed data are data peculiar to the change machine, such as the types and sums of bank notes received, and kinds and sums of the bank notes and coins paid out.
- 45 By providing a memory for recording the number of rejections for each checking function, i.e. for each reason for rejection, and for each type of bank note including unidentified bank notes, it is possible to print the contents of these memories 50 according to an instruction from the instruction input device 8, which can be effected as desired by pressing the printing button when in the optional printing mode. In such a case, the number of rejection cycles is added to the end of the above 55 mentioned data. Namely, the printed code is, for example, "J-RJCT-01-01-(number)", "J-RJCT-01-02-(number)" or the like. Such printed data allows the frequency of rejection of each type of bank note for each reason for rejection to be quickly 60 ascertained, while eliminating the trouble of providing a printout for each rejection and wasting
- recording paper.
- As described, bank note receiving apparatus embodying the invention records the reason for 65 rejection of a bank note and either prints out the details at the time of each rejection or, alternatively, stores the number of rejections recorded for each type of bank note and each reason so that they may be printed out at any 70 desired time by a printing instruction.
- Therefore it is possible easily and promptly to recognize the reasons for rejection by simply reading the data printed on the recording paper, and to take the necessary measures such as a 75 readjusting the sensitivity levels of the discriminating device in the light of the recorded data. Consequently, the maintenance time is considerably shortened and the rate of operation of the bank note receiving apparatus is 80 advantageously very much increased.

CLAIMS

1. Bank note receiving apparatus, comprising: bank note discriminating means for checking whether or not a bank note is correct; controlling means for receiving signals from the bank note discriminating means indicating the reasons why a bank note is incorrect and having a memory for recording the signals; instruction input means for giving an instruction concerning the reasons why a bank note is incorrect to the controlling means; and printing means for printing out the reasons why a bank note is incorrect upon receipt of an instruction from the controlling means.
2. Bank note receiving apparatus according to claim 1, wherein the bank note discriminating means is capable of checking for abnormal running, abnormal bank note length, double feeding of bank notes, abnormal photopatterns, abnormal magnetic patterns, and continuous feeding bank notes.
3. Bank note receiving apparatus according to claim 1 or 2, wherein the printing means also prints out the type of a bank note which is incorrect.
4. Bank note receiving apparatus according to claim 1, 2 or 3, wherein the printing means is arranged to printout the number of times the same reason for rejection of each type of bank note has occurred.
5. Bank note receiving apparatus according to claim 1, 2, 3 or 4, wherein the printing means has an automatic printing mode in which a printout is produced each time a bank note is determined to be incorrect and an optional printing mode in which a printout is produced only when requested.
6. Bank note receiving apparatus substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.
7. Any novel feature or combination of features described herein.

THIS PAGE BLANK (USPTO)

10/08/88 12:46 FAX 18006681233

FAIPAT INC

002

⑩ 日本国特許庁 (JP)

① 特許出願公開

② 公開特許公報 (A)

昭56-136689

③ Int. Cl.³
B 07 C 3/08
/ B 65 H 39/115

識別記号

厅内整理番号
6528-3F
6827-3F

④ 公開 昭和56年(1981)10月26日

発明の数 1
審査請求 未請求

(全 3 頁)

⑤ 紙類分類装置

⑥ 特 願 昭55-39907
⑦ 出 願 昭55(1980)3月28日
⑧ 発明者 高橋省造川崎市幸区柳町70番地東京芝浦
電気株式会社柳町工場内⑨ 出願人 東京芝浦電気株式会社
川崎市幸区堀川町72番地
⑩ 代理人 弁理士 鈴江武彦 外2名

明細書

1. 発明の名称

紙類分類装置

2. 特許請求の範囲

(1) 2種類以上が混在する状態で供給された供給部内の紙類を順次1枚ずつ取出して検知装置で判別し、この判別結果にもとづいて該部の指定の位置に区分収納するようにしたものにおいて、上記検知装置で相應の判定ができないかつた場合、紙類を空送部の停止により一旦停止させ、且つによりこの紙類の位置を判定して指定スイッチを押すことにより判別不能に該当の位置に収納、計数されるようにしたことを特徴とする紙類分類装置。

(2) 検知装置は複数の検知部からなり、少なくとも1つの検知部が判定不能であった場合、検知装置を判別不能とともに同時に収納、計数するための指定のスイッチからの人力操作と判定不能であつた検知部からの情報をとが

一致したとき吸音部を取込出すようにしたことを特徴とする特許請求の範囲第1項に該当の紙類分類装置。

3. 発明の詳細な説明

本発明は、たとえば2種類以上の紙類の吸音部を自動的に区分する吸音部分類装置に関するものである。

通常、この機器においては、表面が汚れていたり、破損したりしていてそれを自分で洗浄できなかつた場合は表面には異常されずに過ぎ、手洗いに時間がかかるようになつてゐる。

しかしながら、使用においては、この機器された紙類は必ずのもつ検知装置では判別不能のため、分別、計数、収納することができないといった問題があつた。

そこで、前段、供給部に挿入された未分類の紙類を全部吸音しきえた後で、該部に挿入された紙類を1枚ずつ目視によつて各部を判別し、判別した紙類を1枚ずつ収納にさせ、その紙類の位置に該当する指定スイッ

を押し、この紙表面を実質的に指定の区分箱に収め、封緘させるようにしたものが発見された。

しかし、このものは封緘された紙表面については再び供給車に1枚ずつ供給して使用しなければならず、操作上わざらわしいといった欠点がある。

本発明は、上記事情にもとづきなされたもので、その目的とするところは、判別不能とされた紙表面を操作することなく実質的かつ確実に計数、分類し得るようにした紙表面分類装置を提供しようとするものである。

以下、本発明を図示の一実施例を参照して説明する。図中1は表示操作部であり、その表示操作部1の手前側下方には供給部2が設けられている。この供給部2には五百円、千円、5千円、一万円の4種類の紙幣3…が現在した状態で貯蔵されている。この供給部2内に立位状態かつ田方向に重ねられた紙表面3…は専用ロータ4の周面に付て壁の端の紙表面3が順次突出され第1、第2の搬送ベルト5、6右より第3、

知能7、曲線検知部8からなっており、これら機知部16、17、18の少くとも1つが判定不能であつた場合、検知装置11を判別不能とし、専用ロータ4および搬送ベルトの取出しおよび搬送動作を一旦停止するようになつている。

また、専用表示部1にはオペレーターのコード西符号を入力するためのテンキー部19、スタートスイッチ20、ジャム检测などで一旦矢印を停止した場合の再スタート時に使用するカスタートスイッチ21、実時始乗券を表示する表示部22、紙計数未を通過したままが施行される場合は出口23および検知装置11で判別不能とされた紙表面3を実質的に所定の操作部11～14に吸収、封緘せらるための組合スイッチ(各組合スイッチ)24～27、29～31が配置されている。

ついに、上記実施例の動作を述べる。専用ロータ4の出入口にて供給部2から取出された紙表面3…は専用1の搬送ベルト5によって取込

図56-136689 (2)

専用の搬送ベルト5、6の相反方向面部で取込まれた紙表面3の第1の搬送路5により込まれ専用部6に搬送されるようになつてある。

また、上記専用部6は5百円、千円、5千円一万円の4種類の紙表面3…を区分箱するための4種の区分箱11a、11b、11c、11dを有した構成となつてある。これらは区分箱11a、11b、11c、11dの上端受入口部は専用部6の搬送ベルト5とこの専用の搬送ベルト5の下端面に通過されたローラ12…によつて形成され上部端の搬送路5と垂直する水平な第2の搬送路5の下端面に対応している。

さらに、第1の搬送路5の右端面には搬送される紙表面3の種別の判別と計数を行う検知装置11が配置されているとともに第2の搬送路5の中央部には専用部11a、11b、11cに対向してダイバータ13a、13b、13cが配置されている。

上記検知装置11は長さ検知部16、色加權

検送され、この搬送途中において検知装置11で検出された判別と計数が行われたのち、第2の搬送路5に送り込まれる。そして、上記専用部6での検査結果によつてそれぞれの専用部6に当する指定の専用箱11a、11b、11c、11dに区分箱される。すなはち、たとえば検知装置11で検出された紙表面3が専用部6の左から3番目の専用箱11cに運搬されるべき5千円の紙表面3であつた場合には、専用部6により判別された情報によつて紙表面3が3ヶ月の検査結果11cに近づいたときにタイミングをとつて専用部11cに対向して配置されたダイバータ13aが実際状態に回転偏位し、上部紙表面3を専用部11c内に取容するようになつてゐる。

一方、背面が汚れていたり、細相したりして検知装置11で検出できなかつた紙表面3が検知装置11を通過すると専用1の搬送路5および専用ロータ4は同時に停止し、判別不能の紙表面3は検知装置11の出口付近で停止される。

この位置において検知不能の紙幣³を目視で差別し表示操作部¹の該当する表示²の表示に相当する指定スイッチすなわち、5千円券であると判断した場合には5千と表示されている指定スイッチ^{26c}を押す。

検知部¹⁴の検知部^{16, 17, 18}において紙幣³の大きさ、色具合、面値を検知し、それぞれの検知部^{16, 17, 18}の判定の情報が合致した時にその紙幣³が本機構中のある1券種と判断される。しかし、この3つの検知部^{16, 17, 18}のどれか1つたとえは長さ検知部¹⁶でも検定不能であつた場合に、前述した判断不能という扱いをする。

この時点では上記のように目視によって、指定スイッチ^{26c}が押されるか、検定不能であつた長さ検知部¹⁶以外の検定可能の検知部^{17, 18}からの情報と押された指定スイッチ^{26c}との情報とが一致した場合のみ一旦停止させた紙幣³を通過させ、相当する表示部²に吸めし計算する。

図9は本発明の一実用例を示す断面的構成図である。

1…供給部、3…紙幣部(紙幣)、4…紙幣部³の面値部、5…無面値部、11a～11d…区分用、14…検知部、16…長さ検知部、17…色別検知部、18…面値検知部、26a～26d…指定スイッチ。

出版人代印人　弁理士　吉江政信

特開昭56-136689 (3)

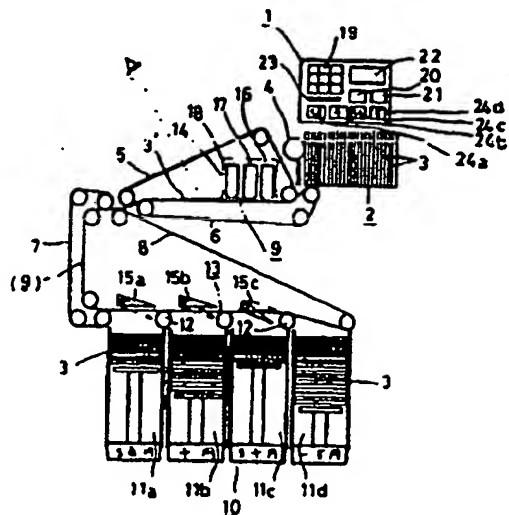
検定可能であつた検知部¹⁴、18の情報と押された指定スイッチとの情報とか異なる場合には押し間違いとみなし、通過させない。

また、万が一、3つの検知部^{16, 17, 18}が共に検定不能であつた場合、あるいは3つの検知部^{16, 17, 18}でそれぞれが異なる検定をした場合には検知部¹⁴の情報を利用できないため、この場合には目標物を他の指定スイッチを2回押し、押し間違いでないとそれを入力して通過させることとする。

以上説明したように本発明によれば、検定不能な紙幣を通過することなく短時間かつ確実に計数、分類でき、また再び検査部から通過するというわざわざしさがなくなるし、操作するための取扱路や操作部が不要になり、構成の簡素化が図れる。

また、検定可能であつた検知部の情報と指定スイッチとの情報の一致をみるので分類、計数の間違いがなくなるといった効果を有する。

4. 図9の簡単な説明



この位置において検知不能の紙角³を目視で
检测を判断し表示操作部¹の該角³の各種に相
当する指定スイッチ²⁴すなわち、3千円券である
と判断した場合には5千と表示されている指定
スイッチ²⁴をONに操作す。

検知装置¹の検知部¹⁶、¹⁷、¹⁸において該角³の大きさ、色共合、形状を検知し、それぞれの検知部¹⁶、¹⁷、¹⁸の判定の情報が合致した時にその紙角³がもつ機中のある1
条件と判断される。しかし、この3つの検知部¹⁶、¹⁷、¹⁸のどれか1つとえげ長さ検
知部¹⁹1つでも検定不能であつた場合に、該
該した判別不能という扱いをする。

この時点では上記のように目視によつて、指定
スイッチ²⁴とこれが押されるが、検定不能であつ
た長さ検知部¹⁹以外の検定可能の検知部¹⁶、¹⁷
からの情報を押された指定スイッチ²⁴ととの
情報とが一致した場合のみ一旦停止させた
紙角³を通過させ、担当する発信部¹¹に吸
めし計算する。

図6は本発明の一実例を示す構造的概要図
である。

2…供給部、3…紙角部(紙帶)、4…第1
印字部、5…無印部、11a～11d…区分
部、14…検知装置、16…長さ検知部、17
…色別検知部、18…形状検知部、24a～
24d…指定スイッチ。

出版人代筆人　开運士　内江政雄

特開昭56-136689 (3)

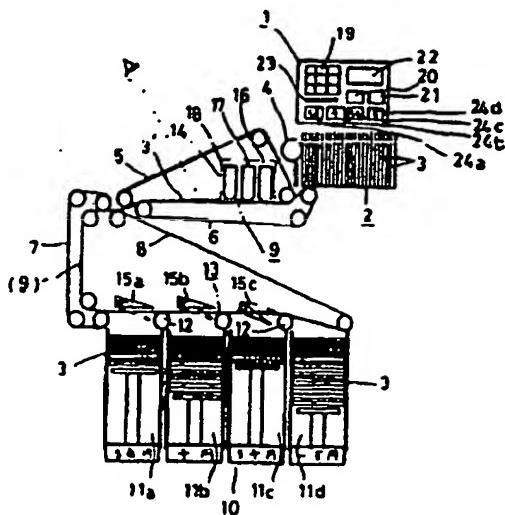
検定可能であつた検知部¹⁶、¹⁷の情報を
押された指定スイッチとの情報とか共なる場合
には押し間違いとみなし、通過させない。

また、万が一、3つの検知部¹⁶、¹⁷、¹⁸
が共に検定不能であつた場合、あるいは3
つの検知部¹⁶、¹⁷、¹⁸でそれぞれ異なる
た検定をした場合には検知装置¹の情報を
利用できないため、この場合には目標物定位の指
定スイッチ²⁴を2回押し、押し間違いでないと
を入力して通過させることとする。

以上説明したように本発明によれば、複数不
規則な形状を通過することなく選択的かつ確実
に計測、分類でき、かつ再生供給部から通過
するというわざらわしさがなくなるし、測定する
ための駆動部や測量部が不要になり、機械の簡
素化が図れる。

また、検定可能であつた検知部の情報を押された
指定スイッチとの情報の一致を見るので分類、計測
の間違いがなくなるといった効果を有する。

4. 図面の簡単な説明



#4. Japan

Appln. 56-136689
translation

Unexamined Published Japanese Patent Application No. 56 -
136689.

Unexamined Publication Date: October 26, 1981

Application No. 55 - 39907

Application Date: March 28, 1980

Request for Examination: Not Made

Inventor: Shozo Takahashi

Applicant: Tokyo Shibaura Denki Kabushiki Gaisha

Title of the Invention:

Paper Sorting Apparatus

S P E C I F I C A T I O N

1. Title of the Invention

Paper Sorting Apparatus

2. Scope of the Claim

- (1) A paper sorting apparatus in which notes of paper, as fed in a mixed state of two or more kinds to a feed unit, are let off sequentially one by one and are discriminated by a detection unit so that they are sorted and stacked on the basis of the discrimination result on a designated compartment of a stack unit, characterized in that when the kind cannot be discriminated by said detection unit, the paper notes are once stopped by interrupting a conveyor unit and are visually discriminated on their kind so that they are forcibly accommodated in the designated compartment and counted by pushing a designation switch.
- (2) A paper sorting apparatus as set forth in claim 1, characterized in that the detection unit includes a plurality of detectors so that when at least one detector is indecisive, the detection unit is made indecisive and so that the paper notes are let in and conveyed when a coincidence is made between the input data coming from the designation switch for the forced accommodation and the counting and the data coming from the decisive detector.

3. Detailed Description of the Invention

The present invention relates to a paper sorting apparatus for sorting automatically notes of paper such as notes of paper currency of two or more denominations.

In the apparatus of this kind, it is customary that the paper notes, which could not be discriminated because of their soiled surfaces or breakages, are not stacked on a stack unit but are caused to pass therethrough and accumulated in an exit.

In the prior art, however, the paper notes thus removed cannot be discriminated by the detection unit of the apparatus to raise a problem that they cannot be sorted, counted and accumulated.

In recent years, there has been made a development in which at the stage when all the unsorted paper notes accumulated in the feed unit are processed out, the notes discharged to the exit are visually discriminated one by one on their kinds, in which the discriminated paper notes are placed one by one on the feed unit, and in which a designation switch corresponding to the kind of the paper notes is pushed so that they may be forcibly accommodated in the designated compartment and counted.

In this development, however, the paper notes removed have to be fed again one by one to and processed by the feed unit, thus raising a defect that the operations are troublesome.

The invention has been conceived in view of the background thus far described and has an object to provide a paper sorting apparatus capable of counting and sorting the notes of paper, which have been indiscriminative, forcibly and reliably without being removed.

The invention will be described in connection with its one embodiment with reference to the accompanying drawings. Reference numeral 1 appearing in the drawing designates a display control unit, and a feed unit 2 is disposed at this side and under the display control unit 1. In this feed unit 2, there are accumulated in a mixed state notes of paper currency 3 -- of four denominations of ₩500, ₩1,000, ₩5,000 and ₩10,000. The paper currency notes 3 --, as layered in their facial directions and in standing positions within the feed unit 2, are sequentially let off from their foremost end as a let-off rotor 4 turns, and are fed to a transversely I-shaped first passage 9, which is formed of the opposed faces of first and second conveyor belts 5 and 6 and third and fourth conveyor belts 7 and 8, until they are conveyed to a stack unit 10.

This stack unit 10 is constructed to have four compartments 11a, 11b, 11c and 11d for sorting and stacking the notes 3 -- of the four denominations of ₩500, ₩1,000, ₩5,000 and ₩10,000. The upper end entrances of these compartments 11a, 11b, 11c and 11d confront the lower face side of a horizontal second passage 13 which is formed by the fourth conveyor belt

8 and rollers 12 --- arranged at a suitable interval on the lower face side of the fourth conveyor belt 8 and which has communication with the first passage 9.

On the starting end side of the first passage 9, on the other hand, there is arranged a detection unit 14 for discriminating the denominations and counting the paper currency notes 3 conveyed. Midway of the second passage 13, moreover, there are arranged diverters 15a, 15b and 15c which are opposed to the compartments 11a, 11b and 11c.

The detection unit 14 is composed of a length detector 16, a color detector 17 and a magnetic detector 18. If at least one of these detectors 16, 17 and 18 cannot discriminate, the detection unit 14 is inactivated to interrupt the letting-off and conveying actions of the let-off rotor 4 and the passage 9.

On the display control unit 1, on the other hand, here are arranged: a ten-key set 19 for inputting the code number or the like of an operator; a start switch 20; a restart switch 21 to be used for restarting the apparatus which has been once stopped for treating a jamming or the like; an indicator 22 for indicating a totaled result; a slip issuing slit 23 for issuing a slip which is recorded with the totaled result; and designation switches (or denomination switches) 24a, 24b, 24c and 24d for accumulating the paper currency notes 3, which could not be determined by the detection unit 14, forcibly in the

predetermined compartments 11a to 11d and for counting the notes

3.

Here will be described the actions of the embodiment. The paper currency notes 3 - - -, as sequentially let off the feed unit 2 as the let-off rotor 4 rotates, are let in by and conveyed through the first passage 9. Midway of this conveyance, the notes 3 - - - are discriminated on their denominations and counted by the detection unit 14 until they are fed to the second passage 13. Depending upon the detection results of the detection unit 14, moreover, the notes 3 - - - are sorted and stacked in the designated compartments 11a, 11b, 11c and 11d corresponding to the individual denominations. Let the case be considered in which the paper currency notes 3, as detected by the detection unit 14, are the notes 3 of \$5,000 to be stacked in the third compartment 11c, as located from the lefthand side, of the stack unit 10. When the notes 3 approach the third compartment 11c, the diverter 15c, as arranged to confront the compartment 11c, is timed by the discrimination information of the detection unit 14 to turn to the state, as shown by the solid line, so that the notes 3 are stacked in the compartment 11c.

When a note 3', which could not be discriminated by the detection unit 14 because of a soiled surface or breakage, passes through the detection unit 14, on the other hand, the first passage 9 and the let-off rotor 4 instantly stop so that the indiscriminative note 3' is stopped near the exit of the

detection unit 14.

At this position, the denomination of the indiscriminative note 3 is visually discriminated, and the designation switch corresponding to the denomination of the note 3' of the display control unit 1, that is, the designation switch 24c indicating \$5,000 when this denomination is discriminated is pushed.

The note 3 is detected on its length, color and magnetism by the detectors 16, 17 and 18 of the detection unit 14. When the data of discrimination of the individual detectors 16, 17 and 18 agree, the note 3 is decided to belong one of the four denominations. If one of these three detectors 16, 17 and 18, e.g., the length detector 16, cannot discriminate, however, the note 3 is handled to be indiscriminative, as described above.

At this time, the designation switch 24c is visually pushed. Only when there is a coincidence between the data coming from the decisive detectors 17 and 18 other than the indecisive length detector 16 and the data coming from the pushed designation switch 24c, the note 3' once stopped is conveyed and is accommodated and counted in the corresponding stacker 11c.

When the data of the decisive detectors 17 and 18 and the data of the pushed designation switch are different, this operation is deemed as mistaken, and the conveyance is made.

If all the three detectors 16, 17 and 18 are indecisive or if the three detectors 16, 17 and 18 made different decisions,

the data of the detection unit 14 cannot be utilized. In this case, therefore, the designation switch after the visual discrimination is pushed twice to input the fact that the push is not mistaken, thereby to effect the conveyance.

According to the invention, as has been described hereinbefore, the indiscriminative paper notes can be forcibly and reliably counted and sorted without being removed, thereby to eliminate the trouble of feeding the notes again one by one from the feed unit. Nor is required a passage or a remover for removing the notes so that the construction can be simplified.

Moreover, a coincidence between the data of the decisive detectors and the data of the designation switches is taken to provide an effect the sorting and counting actions are not mistaken.

4. Brief Description of the Drawings

The drawing is a schematic construction diagram showing one embodiment of the invention.

2 - - - Feed Unit; 3 - - - Notes of Paper (or Paper Currency);
9 - - - First Passage; 10 - - - Stack Unit; 11a to 11d - - -
Compartments; 14 - - - Detection Unit; 16 - - - Length Detector;
17 - - - Color Detector; 18 - - - Magnetic Detector; and 24a
to 24d - - - Designation switches.

Agent: Takehiko Susue, Patent Attorney

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- BLACK BORDERS**
- IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- FADED TEXT OR DRAWING**
- BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- SKEWED/SLANTED IMAGES**
- COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- GRAY SCALE DOCUMENTS**
- LINES OR MARKS ON ORIGINAL DOCUMENT**
- REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.

THIS PAGE BLANK (USPTO)